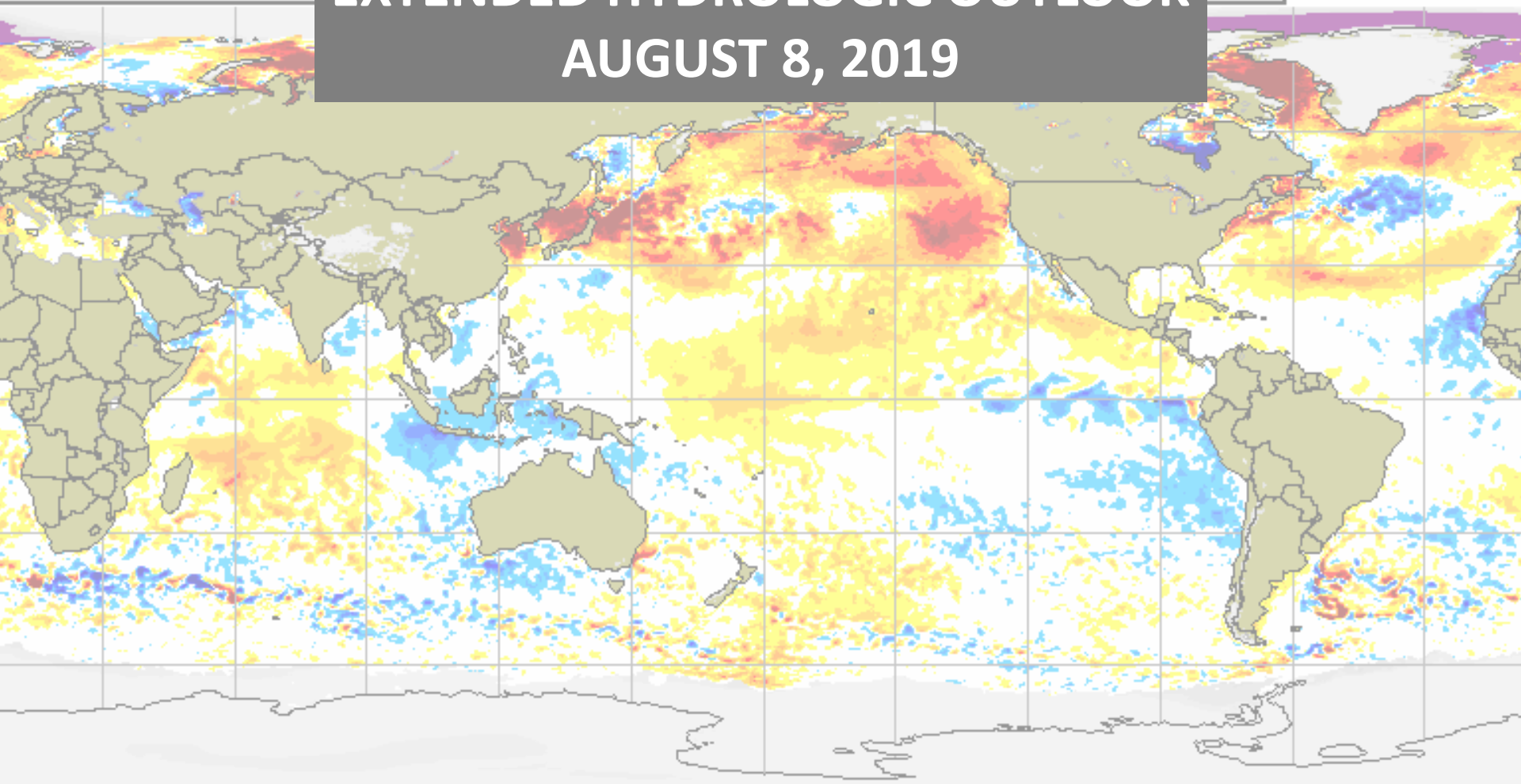
EXTENDED HYDROLOGIC OUTLOOK
AUGUST 8, 2019



Summary

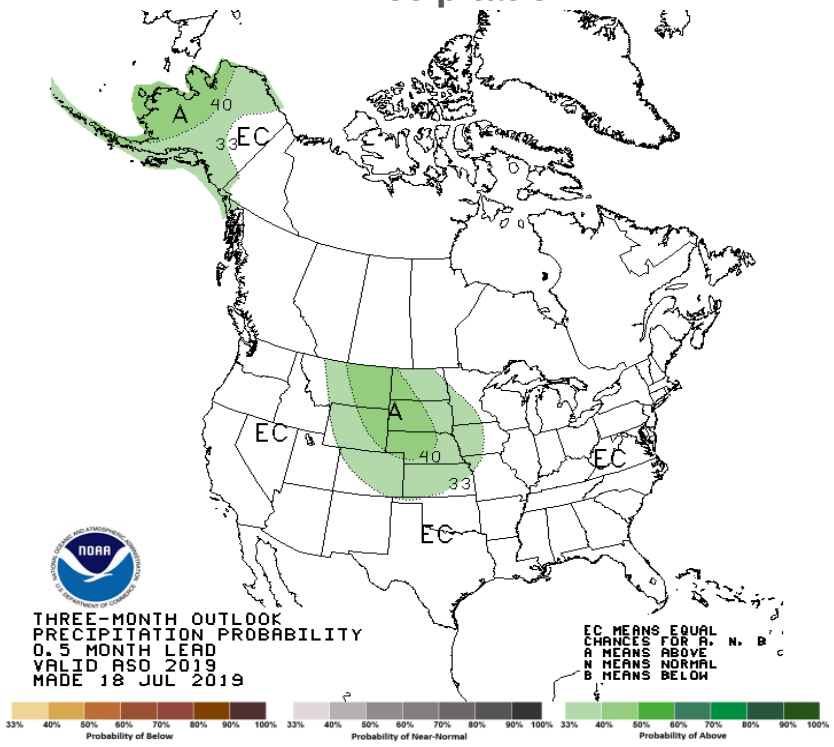
- The Climate Prediction Center (CPC) is forecasting equal chances of above normal, normal and below normal rainfall for August through October.
- El Niño has transitioned to ENSO-neutral, which is most likely to continue through Northern Hemisphere winter 2019-20 (50-55% chance). El Niño increases the chances of a wetter-than-normal dry season and decreases the potential for tropical storm activity from the Main Development Region in the Atlantic Ocean.
- Monitoring Atlantic Multidecadal Oscillation (AMO) index for switch to negative (cold) phase, which has the potential to contribute to drier-than-normal wet seasons.

U. S. Seasonal Outlooks

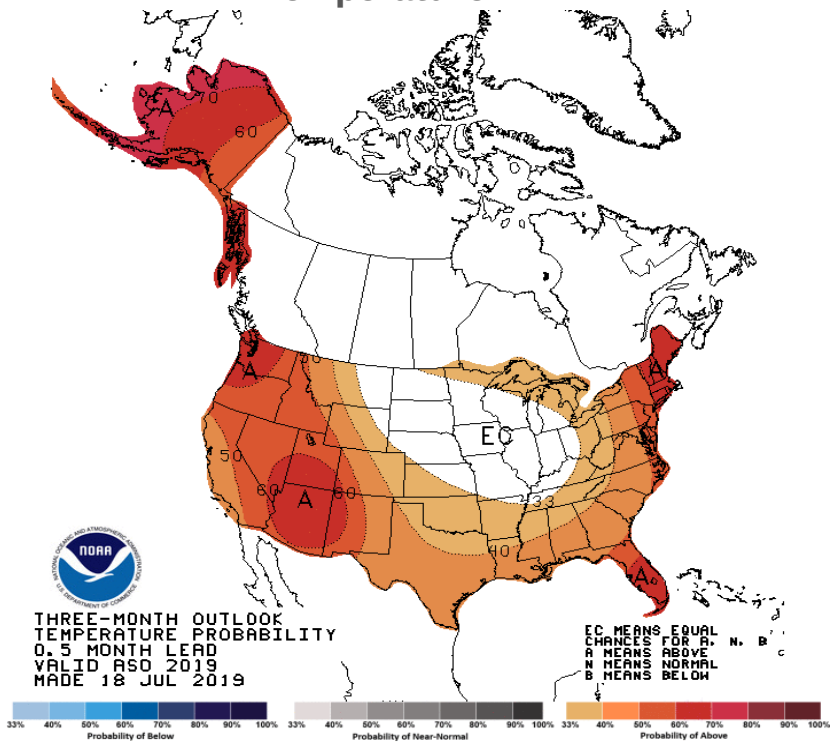
August-October 2019

The seasonal outlooks combine the effects of long-term trends, soil moisture, and, when appropriate, ENSO.

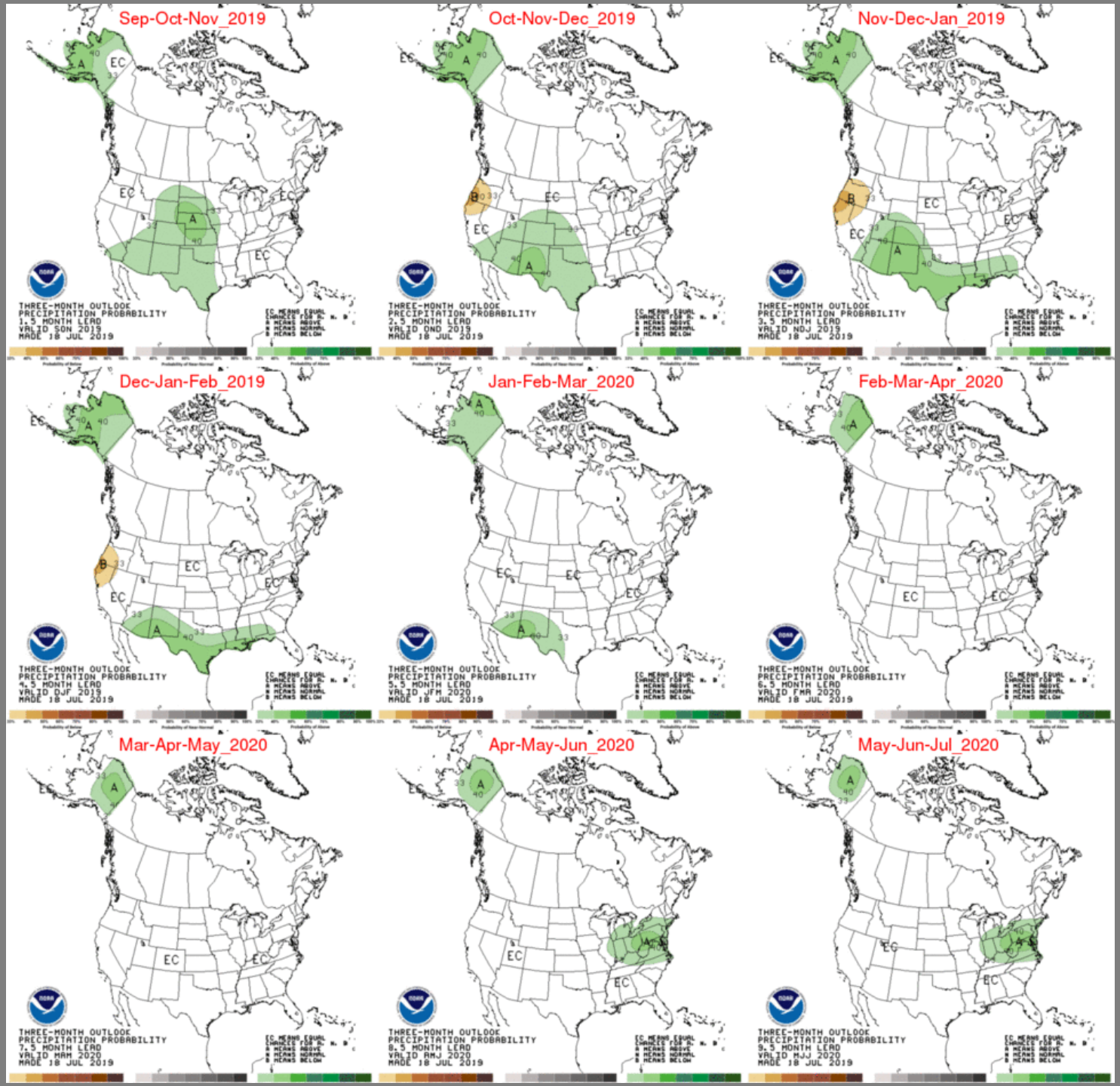
Precipitation



Temperature



Prepared by: Climate Prediction Center/NCEP



Prepared by: Climate Prediction Center/NCEP

Teleconnections to South Florida

Climate anomalies being related to each other at large distances:

El Niño Southern Oscillation (ENSO)

- South Florida dry season (November through May) rainfall is positively correlated with El Niño which has a frequency that ranges between 3 to 7 years while rainfall is negatively correlated with La Niña November through March with a potential increase in tropical rainfall during La Niña

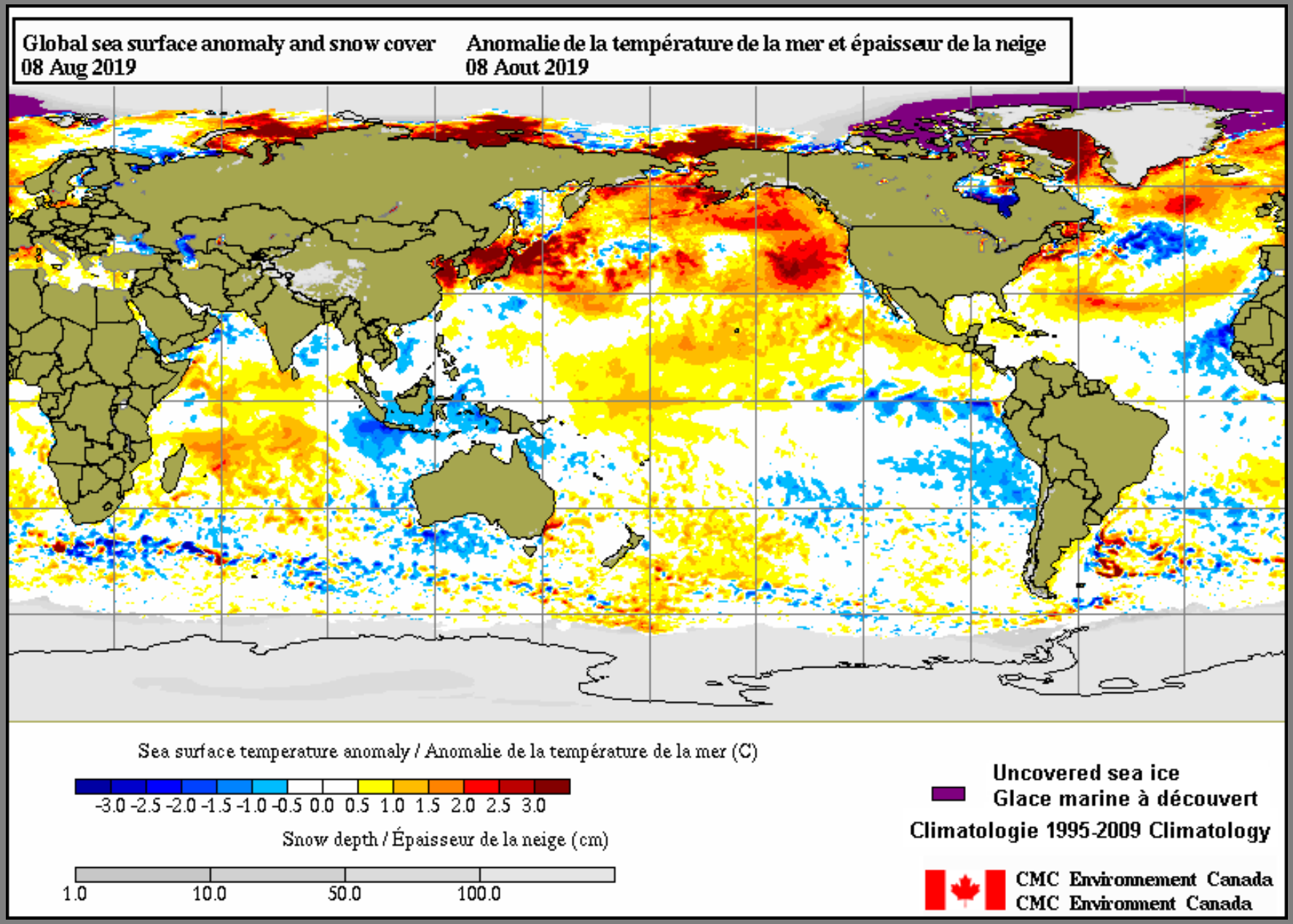
Atlantic Multidecadal Oscillation (AMO)

- Average annual inflow to Lake Okeechobee is nearly 50% greater during the warm phase compared to the cold phase of the AMO, easterly flow toward south Florida affected by phase

Pacific Decadal Oscillation (PDO)

- Increases variations of south Florida dry season rainfall

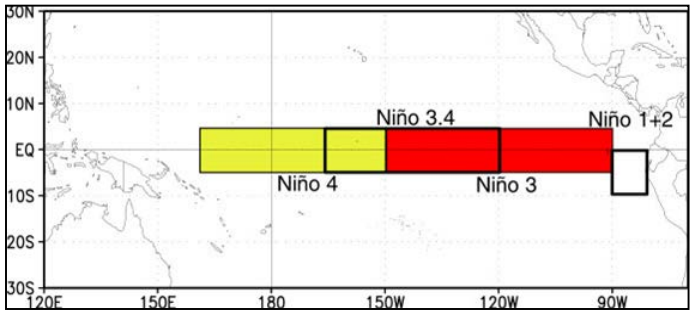
Current Global Sea Surface Temperature Anomalies

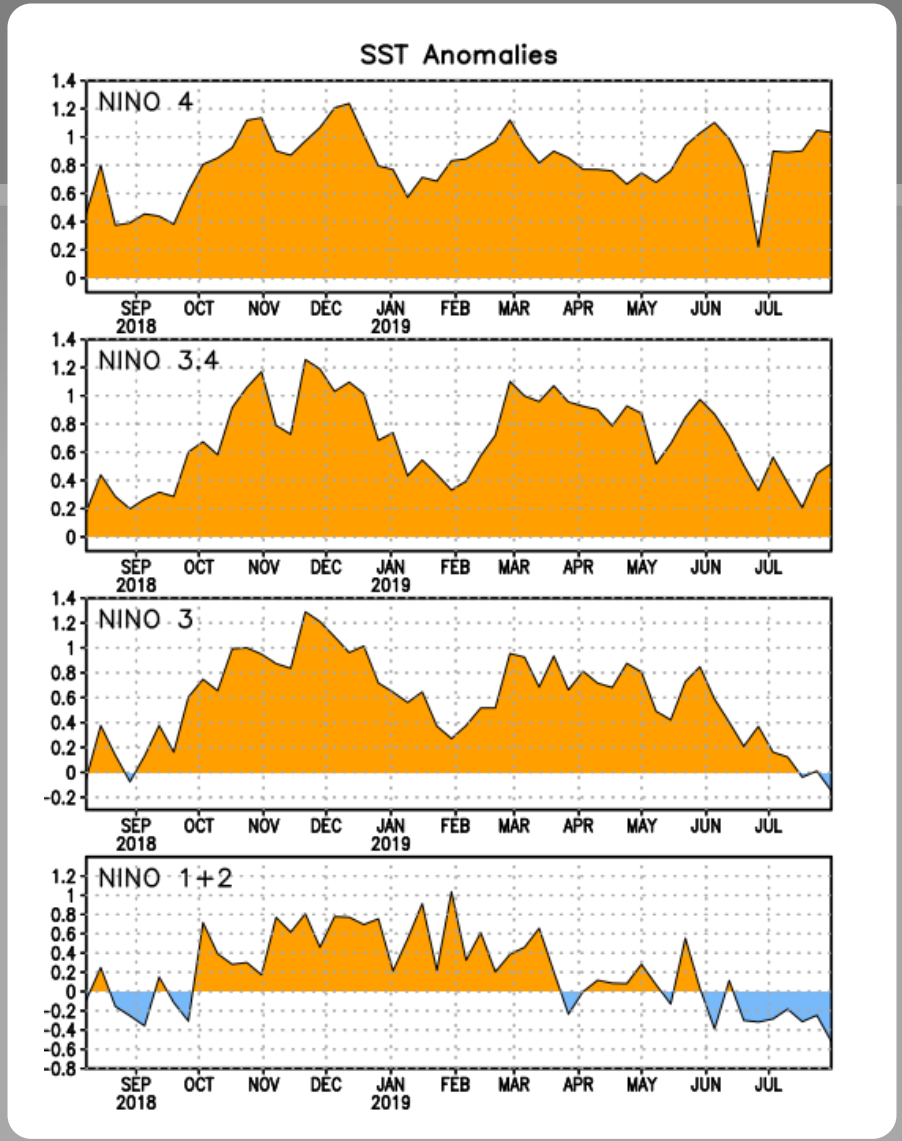


Niño Region SST Departures (ºC) Recent Evolution

The latest weekly SST departures are:

Niño 4	1.0ºC
Niño 3.4	0.5ºC
Niño 3	-0.2ºC
Niño 1+2	-0.5ºC





Prepared by: Climate Prediction Center/NCEP

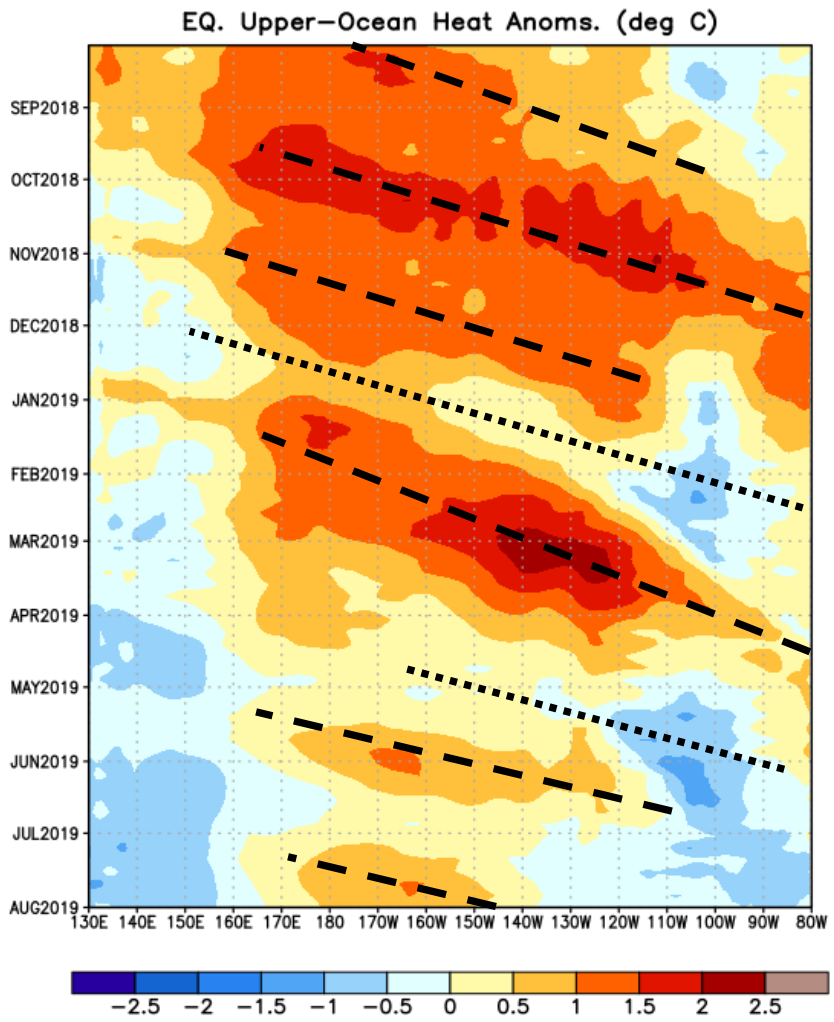
Weekly Heat Content Evolution in the Equatorial Pacific

In early August, October, November 2018 and in January-March 2019, positive subsurface temperature anomalies increased, partly due to downwelling Kelvin waves.

During May 2019, an upwelling Kelvin wave contributed to the reduction of positive subsurface anomalies and emergence of negative anomalies around 110°-90°W.

During May and July, downwelling Kelvin waves helped to increase the positive subsurface anomalies across the central and east-central Pacific. However, negative subsurface anomalies remained over the eastern Pacific.

Equatorial oceanic Kelvin waves have alternating warm and cold phases. The warm phase is indicated by dashed lines. Down-welling and warming occur in the leading portion of a Kelvin wave, and up-welling and cooling occur in the trailing portion.



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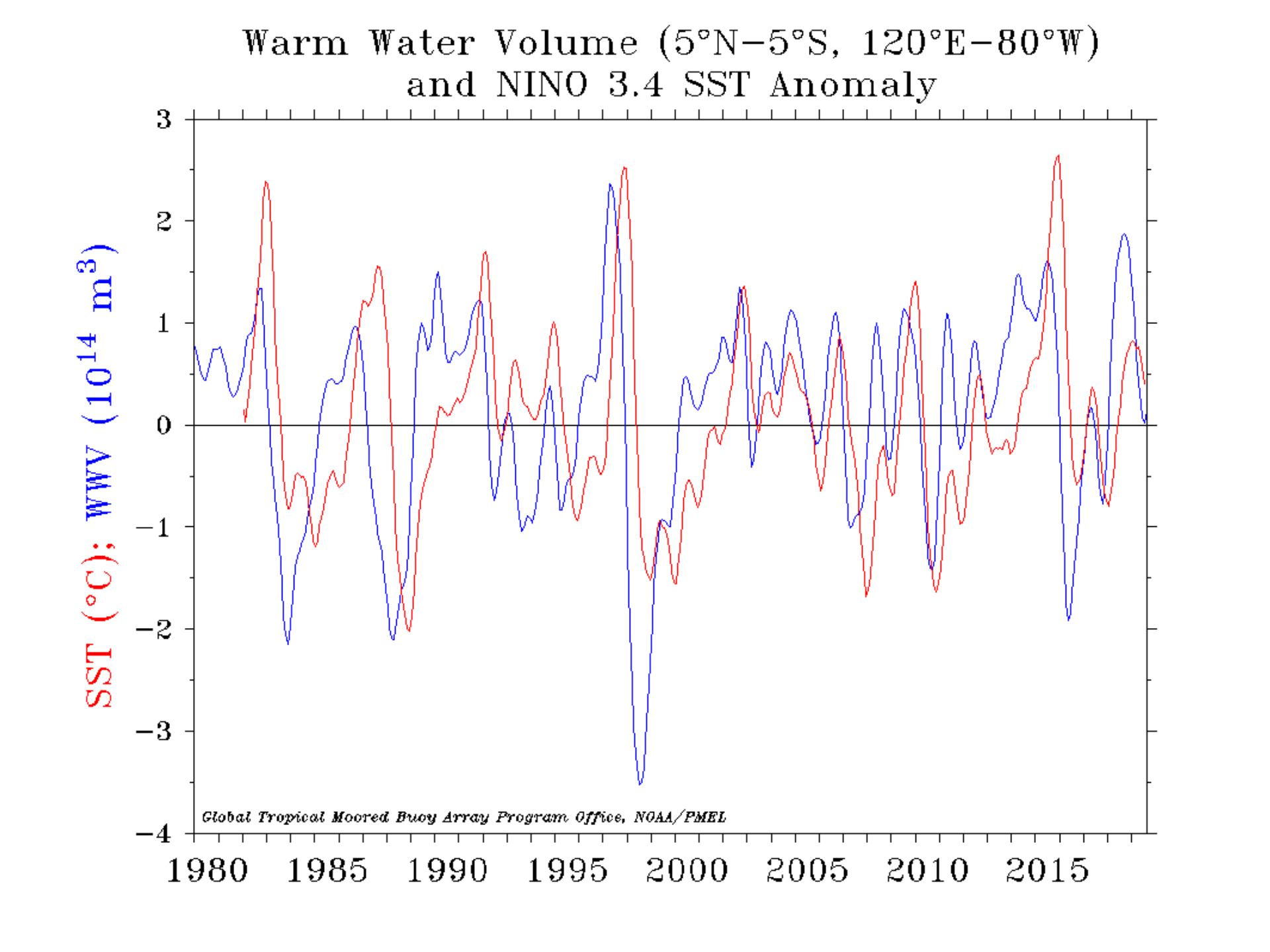
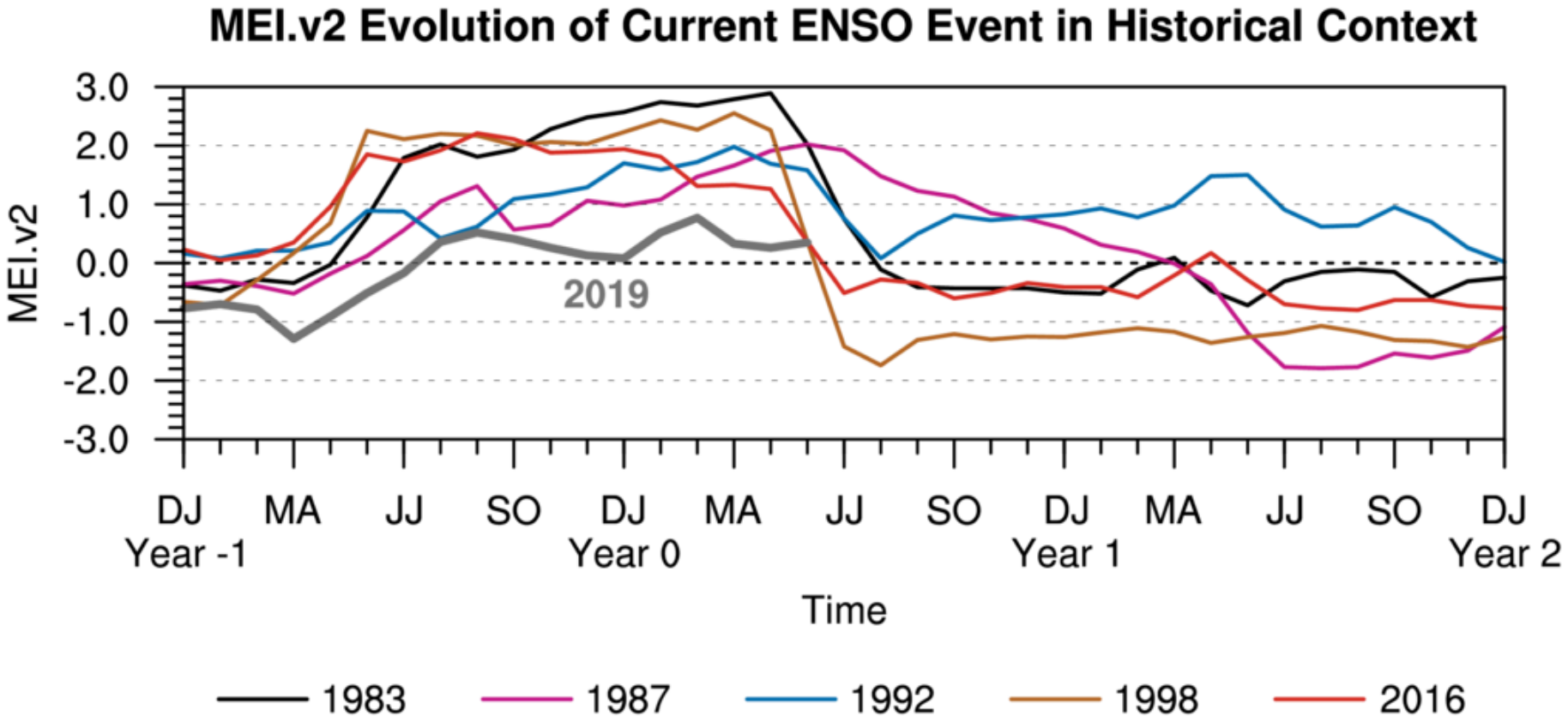
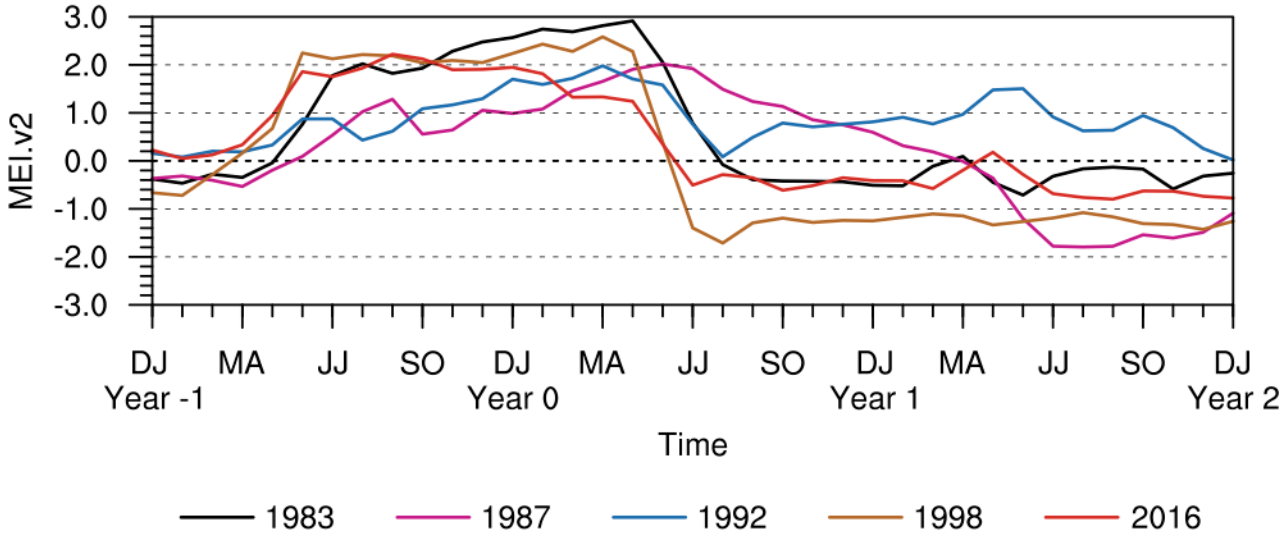

Warm Water Volume (5°N–5°S, 120°E–80°W)
and NINO 3.4 SST Anomaly
SST (°C); WWV (10^{14} m^3)
3
2
1
0
−1
−2
−3
−4
1980
1985
1990
1995
2000
2005
2010
2015
Global Tropical Moored Buoy Array Program Office, NOAA/PMEL

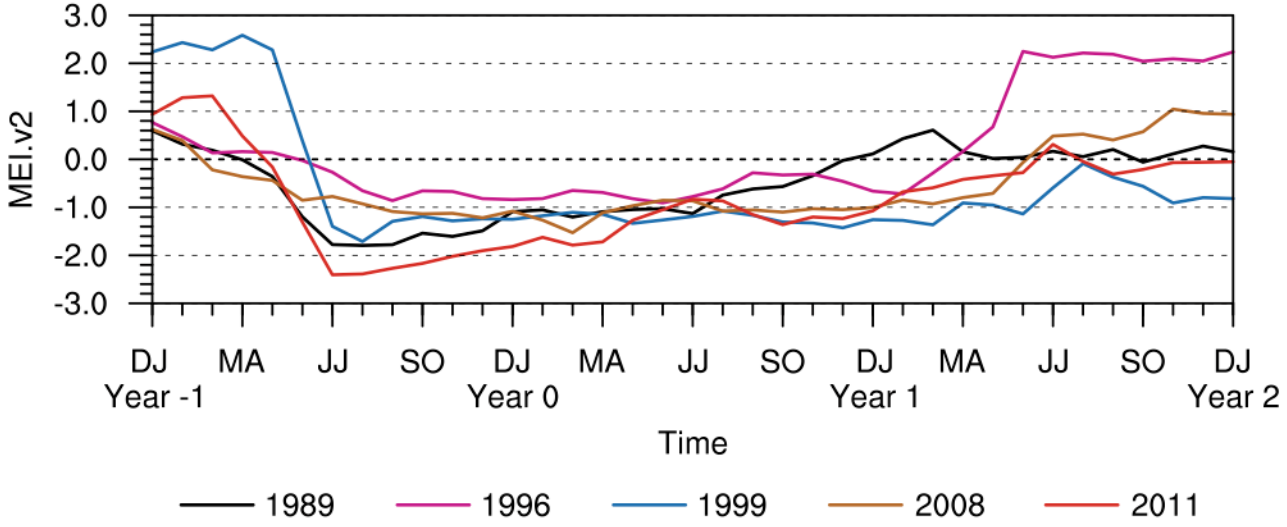

MEI.v2 Evolution of Current ENSO Event in Historical Context
MEI.v2
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
2019
DJ
MA
JJ
SO
DJ
MA
JJ
SO
DJ
MA
JJ
SO
DJ
Year -1
Year 0
Year 1
Year 2
Time
1983
1987
1992
1998
2016

MEI.v2 Evolution of Historical ENSO Events

(a) El Niño

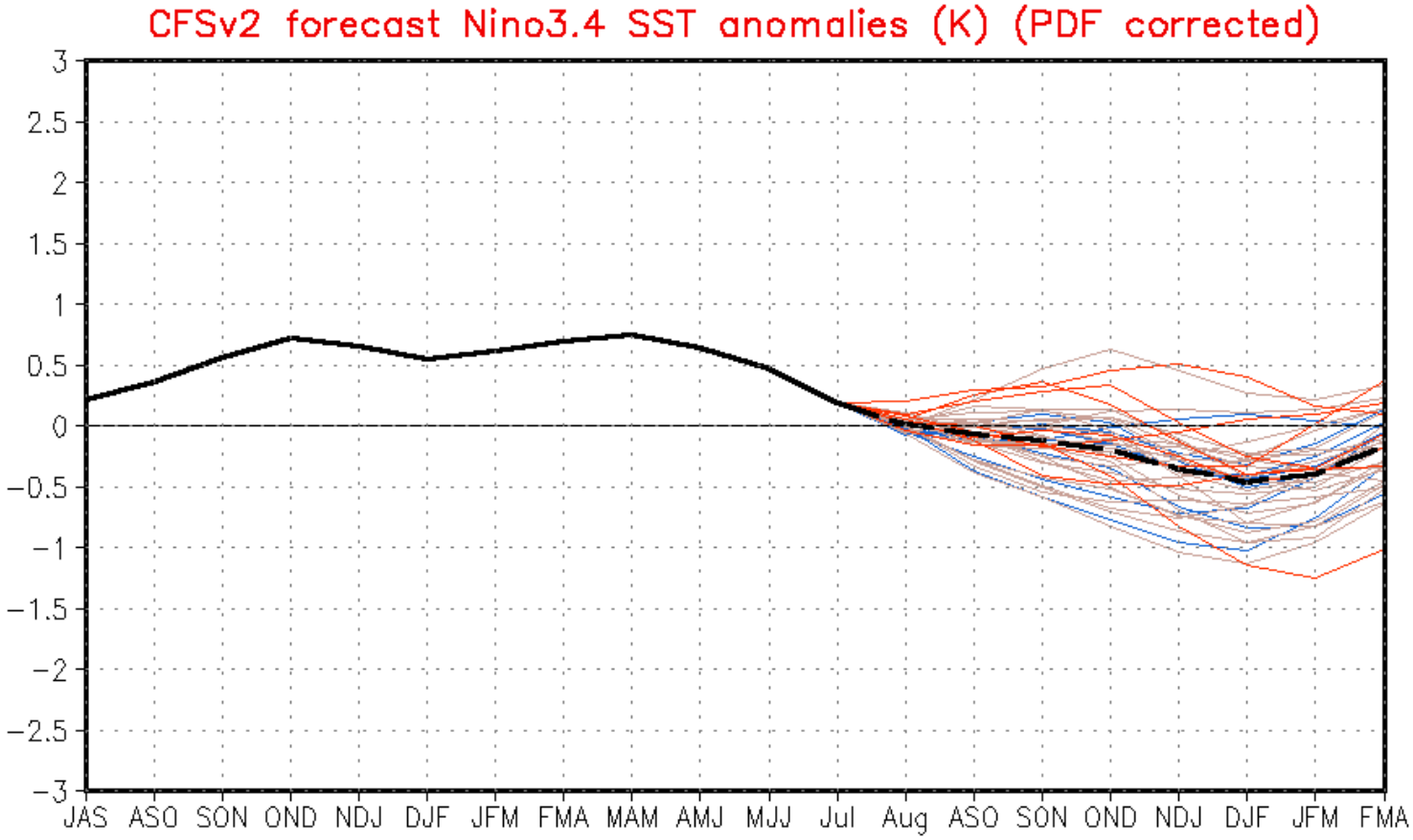


(b) La Niña



NWS/NCEP/CPC

Last update: Thu Aug 8 2019
Initial conditions: 29Jul2019–7Aug2019



(Model bias correct base period: 1999–2010; Climatology base period: 1982–2010)

IRI/CPC Pacific Niño 3.4 SST Model Outlook

The average of the dynamical models (thick red line) predicts ENSO-neutral during the Northern Hemisphere fall and into the winter 2019-20.

The average of the statistical models (thick green line) predicts a weak El Niño to continue into the Northern Hemisphere winter 2019-20.

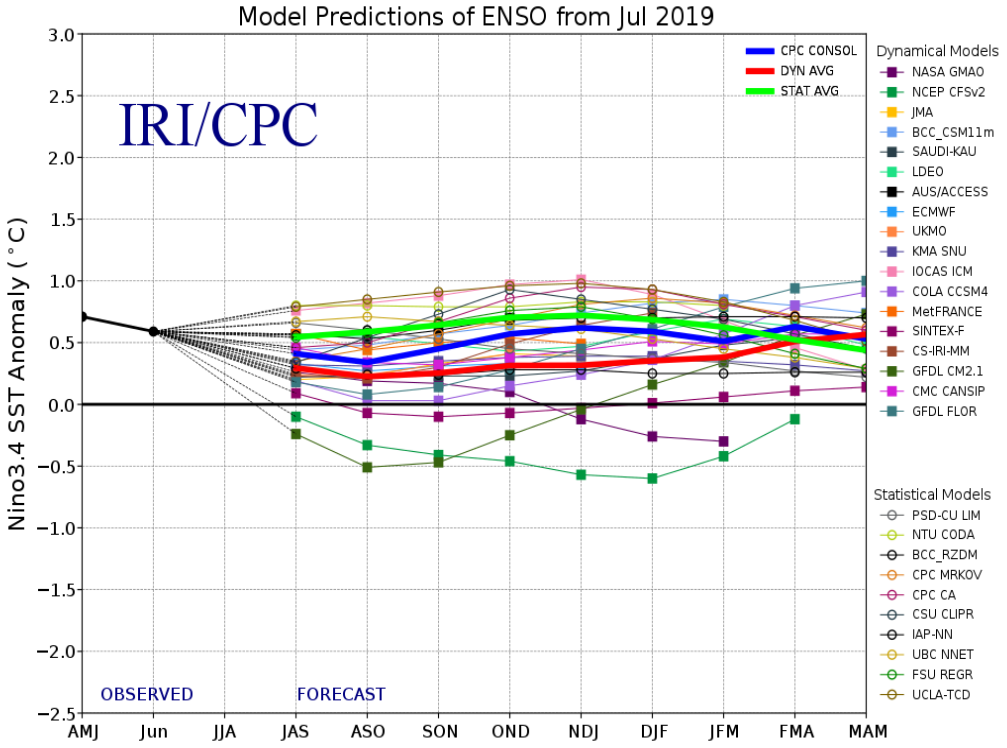


Figure provided by the International Research Institute (IRI) for Climate and Society (updated 19 July 2019).

Prepared by: Climate Prediction Center/NCEP

Historical El Niño and La Niña Episodes Based on the ONI computed using ERSST.v5

Recent Pacific warm (red) and cold (blue) periods based on a threshold of +/- 0.5 ºC for the Oceanic Nino Index (ONI) [3 month running mean of ERSST.v5 SST anomalies in the Nino 3.4 region (5N-5S, 120-170W)]. For historical purposes, periods of below and above normal SSTs are colored in blue and red when the threshold is met for a minimum of 5 consecutive over-lapping seasons.

The ONI is one measure of the El Niño-Southern Oscillation, and other indices can confirm whether features consistent with a coupled ocean-atmosphere phenomenon accompanied these periods. The complete table going back to DJF 1950 can be found here.

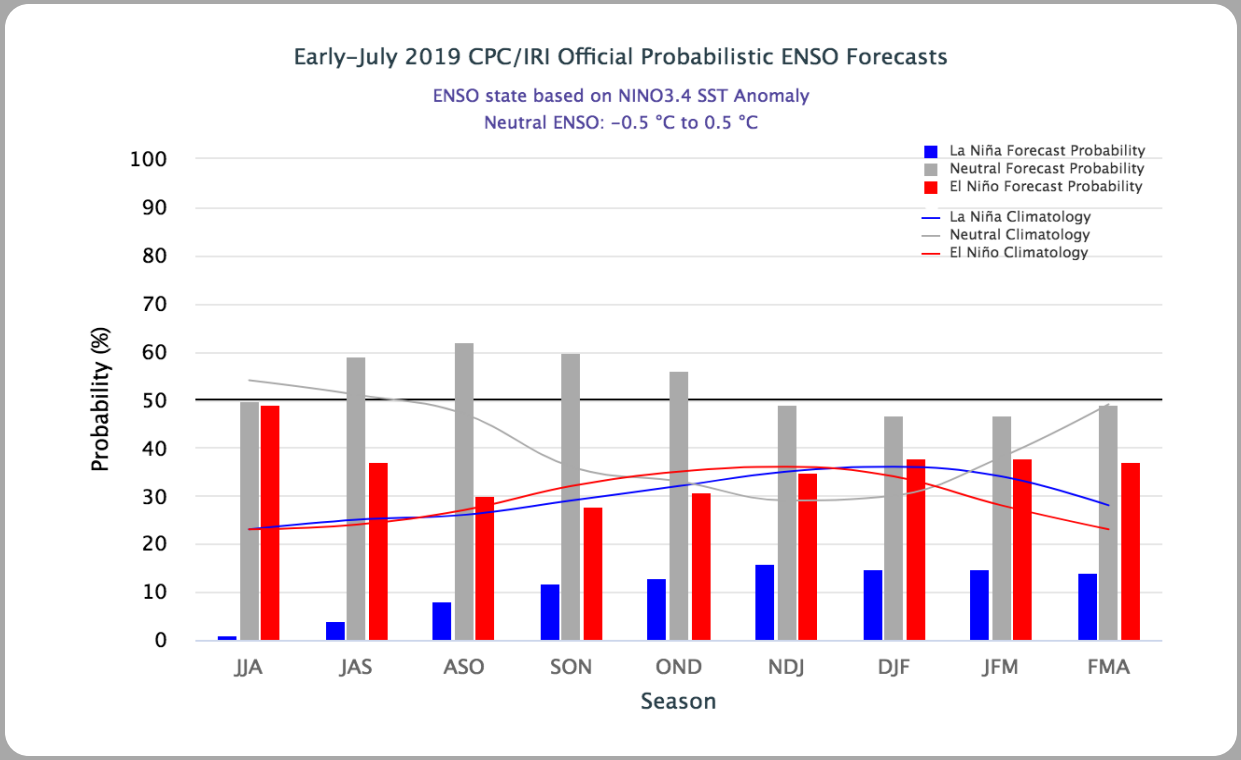
Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
2007	0.7	0.3	0.0	-0.2	-0.3	-0.4	-0.5	-0.8	-1.1	-1.4	-1.5	-1.6
2008	-1.6	-1.4	-1.2	-0.9	-0.8	-0.5	-0.4	-0.3	-0.3	-0.4	-0.6	-0.7
2009	-0.8	-0.7	-0.5	-0.2	0.1	0.4	0.5	0.5	0.7	1.0	1.3	1.6
2010	1.5	1.3	0.9	0.4	-0.1	-0.6	-1.0	-1.4	-1.6	-1.7	-1.7	-1.6
2011	-1.4	-1.1	-0.8	-0.6	-0.5	-0.4	-0.5	-0.7	-0.9	-1.1	-1.1	-1.0
2012	-0.8	-0.6	-0.5	-0.4	-0.2	0.1	0.3	0.3	0.3	0.2	0.0	-0.2
2013	-0.4	-0.3	-0.2	-0.2	-0.3	-0.3	-0.4	-0.4	-0.3	-0.2	-0.2	-0.3
2014	-0.4	-0.4	-0.2	0.1	0.3	0.2	0.1	0.0	0.2	0.4	0.6	0.7
2015	0.6	0.6	0.6	0.8	1.0	1.2	1.5	1.8	2.1	2.4	2.5	2.6
2016	2.5	2.2	1.7	1.0	0.5	0.0	-0.3	-0.6	-0.7	-0.7	-0.7	-0.6
2017	-0.3	-0.1	0.1	0.3	0.4	0.4	0.2	-0.1	-0.4	-0.7	-0.9	-1.0
2018	-0.9	-0.8	-0.6	-0.4	-0.1	0.1	0.1	0.2	0.4	0.7	0.9	0.8
2019	0.8	0.8	0.8	0.8	0.6	0.5						

Prepared by: Climate Prediction Center/IRI

CPC/IRI Probabilistic ENSO Outlook

Updated: 11 July 2019

ENSO-neutral is favored to emerge in the next season and to then continue through the Northern Hemisphere fall and winter 2019-20.



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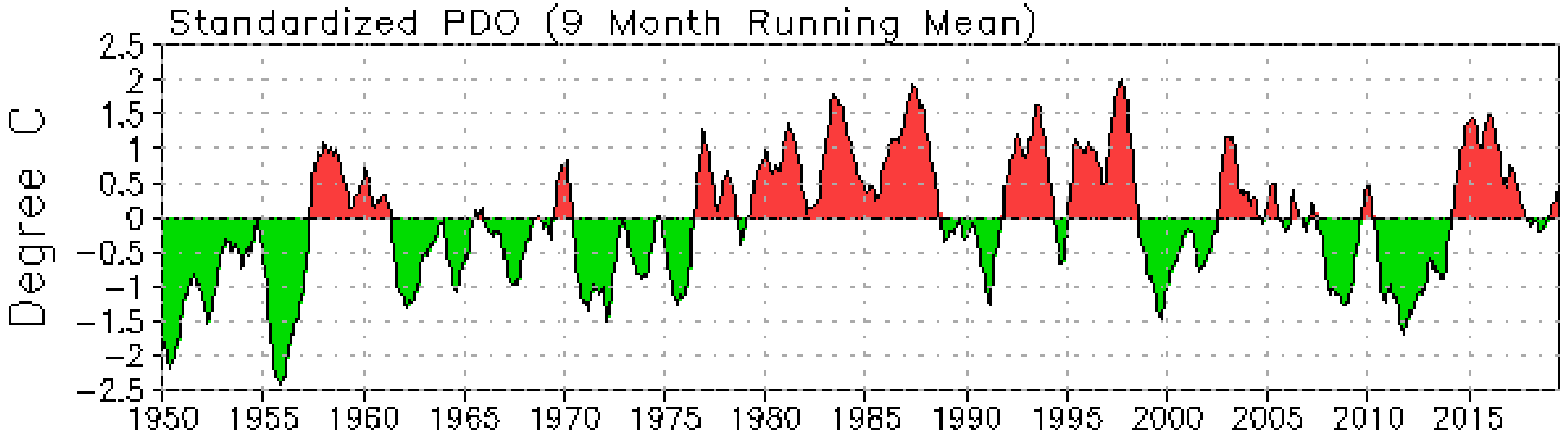
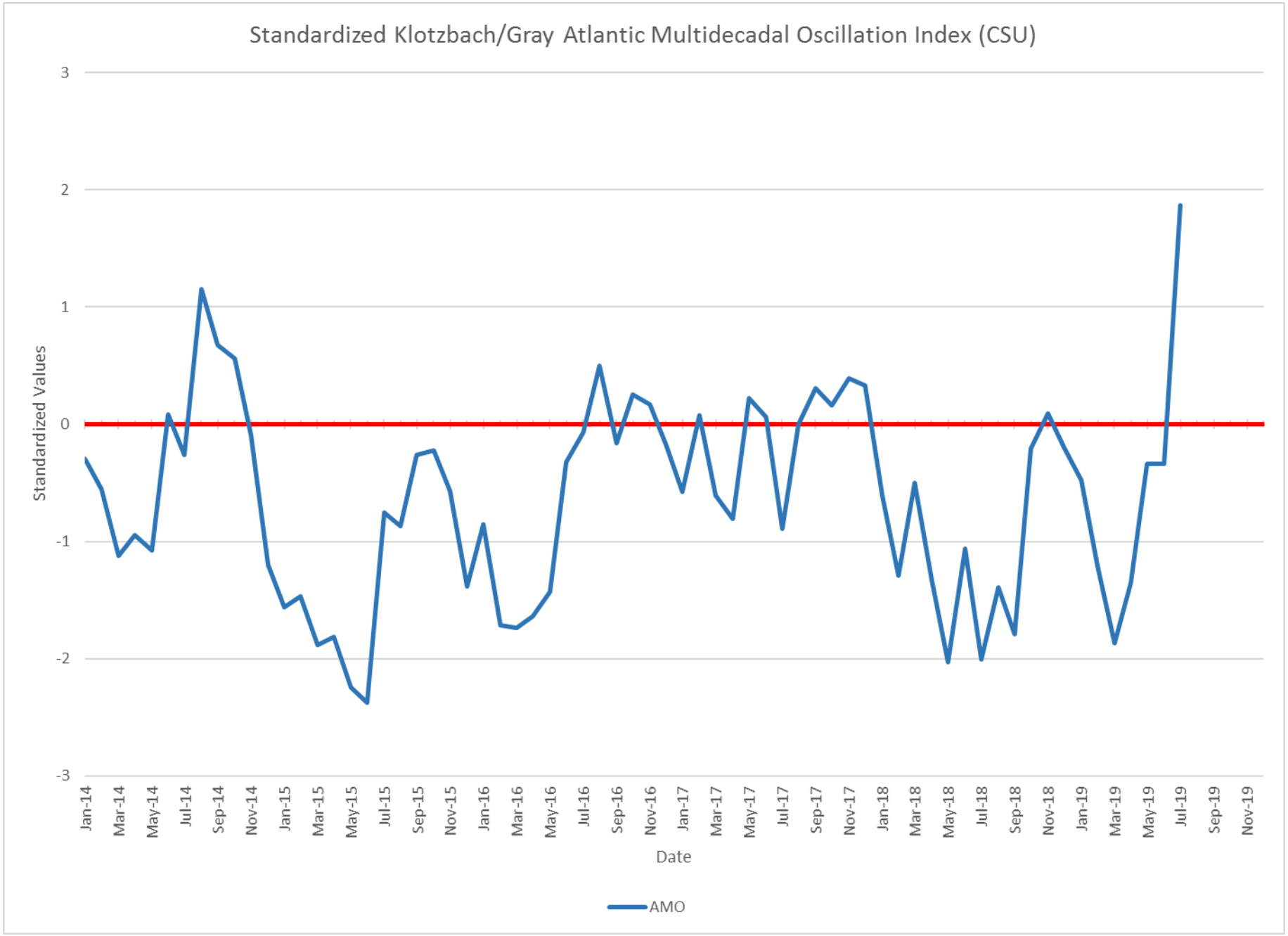
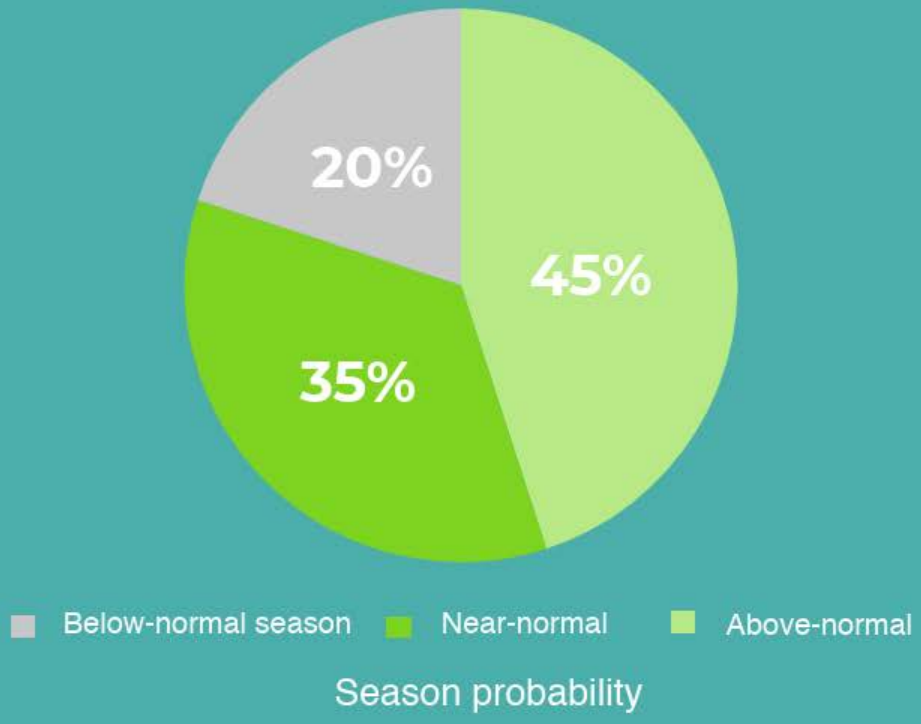

Standardized PDO (9 Month Running Mean)
Degree C
2.5
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
−2.5
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015


Standardized Klotzbach/Gray Atlantic Multidecadal Oscillation Index (CSU)
3
2
1
0
-1
-2
-3
Standardized Values
Jan-14
Mar-14
May-14
Jul-14
Sep-14
Nov-14
Jan-15
Mar-15
May-15
Jul-15
Sep-15
Nov-15
Jan-16
Mar-16
May-16
Jul-16
Sep-16
Nov-16
Jan-17
Mar-17
May-17
Jul-17
Sep-17
Nov-17
Jan-18
Mar-18
May-18
Jul-18
Sep-18
Nov-18
Jan-19
Mar-19
May-19
Jul-19
Sep-19
Nov-19
Date
AMO

2019 Tropical Outlook

2019 Atlantic Hurricane Season Outlook

AUGUST 8 UPDATE



Named storms
10-17

Hurricanes
5-9

Major hurricanes
2-4

NOAA

Be prepared: Visit hurricanes.gov and follow @NWS and @NHC_Atlantic on Twitter.

August 8, 2019

2019 FORECAST AS OF 5 AUGUST 2019

Forecast Parameter	CSU* Forecast	1981-2010 Average
Named Storms (NS)	14	12.1
Named Storm Days (NSD)	55	59.4
Hurricanes (H)	7	6.4
Hurricane Days (HD)	20	24.2
Major Hurricanes (MH)	2	2.7
Major Hurricane Days (MHD)	5	6.2
Accumulated Cyclone Energy (ACE)	105	106
Net Tropical Cyclone Activity (NTC)	110	116

*Forecast numbers include Andrea and Barry

https://tropical.colostate.edu/

Source: Colorado State University/Tropical Meteorology Project